CLAIMS

1. A system for suppressing ambient signals from a signal containing both radiated emissions of an electronic device and the ambient signals, the system comprising:

a first receiver operative to receive the ambient signals and the radiated emissions from the electronic device, the first receiver being operative to demodulate and digitize the ambient signals and the radiated emissions;

a second receiver operative to receive primarily the ambient signals, the second receiver being time and frequency synchronized to the first receiver and operative to demodulate and digitize the ambient signals;

a central computer in electrical communication with the first and second receivers, the central computer being operative to store and process the ambient signals and the radiated emissions from respective ones of the first and second receivers;

wherein the central computer is configured as an adaptive filter operative to suppress the ambient signals correlated between the first and second receivers in order to extract the radiated emissions of the electronic device.

2. The system of Claim 1 further comprising:

a first sensor in electrical communication with the first receiver and operative to receive the ambient signals and the radiated emissions; and

a second sensor in electrical communication with the second receiver and operative to receive primarily the ambient signals.

3. The system of Claim 2 wherein the first and second sensors are operative to convert signals into a corresponding voltage.

4. The system of Claim 2 wherein the first and

second sensors are operative to convert signals into a corresponding electrical current.

5. The system of Claim 2 wherein the first and second sensors are antennas.

6. The system of Claim 2 wherein the first and second sensors are physically distributed from one another.

7. The system of Claim 2 further comprising:

a first telemetry link between the first sensor and the first receiver; and

a second telemetry link between the second sensor and the second receiver.

8. The system of Claim 7 wherein the first and second telemetry links are chosen from the group consisting of:

an electrical conducting cable link;

an optical fiber link; and

an RF telemetry link.

9. The system of Claim 2 wherein the first receiver is co-located with the first sensor and the second receiver is co-located with the second sensor.

10. The system of Claim 2 wherein the first and second receivers are co-located within a single housing.

11. The system of Claim 1 further comprising a clock operative to generate a clock signal that synchronizes the first and second receivers.

12. The system of Claim 11 further comprising an optical fiber extending between and communicating with the first and second receivers in order to transfer the clock signal therebetween.

13. The system of Claim 11 further comprising an electrically conducting cable extending between and communicating with the first and second receivers in order to transfer the clock signal therebetween.

14. The system of Claim 1 wherein the second receiver comprises a plurality of receivers operative to receive

primarily the ambient signals.

15. The system of Claim 1 wherein the first receiver comprises a plurality of receivers operative to receive the ambient signals and the radiated emissions from the electronic device.

16. The system of Claim 1 further comprising:

a first clock in electrical communication with the first receiver; and

a second clock in electrical communication with the second receiver;

wherein the first clock and the second clock are synchronized in order to synchronize the first and second receivers.

17. The system of Claim 1 wherein the first and second receivers are synchronized via an external RF reference signal.

18. The system of Claim 1 wherein the central computer further comprises a digital signal processor operative to facilitate calculations of the adaptive filter.

19. The system of Claim 1 wherein the adaptive filter is configured to operate by a Stochastic Gradient method.

20. The system of Claim 1 wherein the adaptive filter is configured to operate by a Gradient Descent method.

21. The system of Claim 1 wherein the adaptive filter is configured to operate by a Least Squares method.

22. The system of Claim 1 wherein the adaptive filter is a Finite Impulse Response filter.

23. The system of Claim 1 wherein the adaptive filter is an Infinite Impulse Response filter.

24. The system of Claim 1 wherein the adaptive filter is configured to operate by a neural network adaption method.

25. A method of suppressing ambient signals from a signal containing radiated emissions of an electronic

device with a first receiver, a second receiver and an adaptive filter, the method comprising the steps of:

a) detecting the ambient signals and the radiated emissions with the first receiver;

b) demodulating and digitizing the ambient signals and the radiated emissions with the first receiver;

c) detecting primarily the ambient signals with the second receiver;

d) demodulating and digitizing the ambient signals with the second receiver;

e) suppressing the ambient signals correlated between the first receiver and the second receiver with the adaptive filter.

26. The method of Claim 25 wherein the adaptive filter is implemented on a computer and step (e) comprises suppressing the ambient signals with the adaptive filter of the computer.

27. The method of Claim 25 wherein at least some of the ambient signals have multiple paths, and step (e) comprises suppressing the ambient signals having multiple paths.

28. The method of Claim 25 wherein step (e) comprises suppressing the ambient signals using a Gradient Descent method with the adaptive filter.

29. The method of Claim 25 wherein step (e) comprises suppressing the ambient signals using a Stochastic Gradient method with the adaptive filter.

30. The method of Claim 25 wherein step (e) comprises suppressing the ambient signals using a Least Squares method with the adaptive filter.

31. The method of Claim 25 wherein step (e) comprises suppressing the ambient signals with a Finite Impulse Response filter.

32. The method of Claim 25 wherein step (e) comprises

suppressing the ambient signals with an Infinite Impulse Response filter.

33. The method of Claim 25 wherein step (e) comprises suppressing the ambient signals with an adaptive filter configured as a neural network.

34. The method of Claim 25 further comprising a first sensor in electrical communication with the first receiver and a second sensor in electrical communication with the second receiver, wherein prior to step (a), the method further comprises positioning the first sensor to detect the ambient signals and the radiated emissions, and positioning the second sensor to detect primarily the ambient signals.

35. The method of Claim 25 further comprising the step of synchronizing the first and second receivers prior to step (a).

36. The method of Claim 35 wherein the first and second receivers are synchronized via a common clock.

37. The method of Claim 36 wherein the first and second receivers are synchronized via an external RF reference signal.

38. A system for suppressing a first set of signals from a signal containing both the first set of signals and a second set of signals, the system comprising:

a first receiver operative to receive both the first and second sets of signals, the first receiver being operative to demodulate and digitize the first and second sets of signals;

a second receiver operative to receive primarily the second set of signals, the second receiver being time and frequency synchronized to the first receiver and operative to demodulate and digitize the second set of signals;

a central computer in electrical communication with the first and second receivers, the central

computer being operative to store and process the first and second sets of signals from respective ones of the first and second receivers;

wherein the central computer is configured as an adapted filter operative to suppress signals correlated between the first and second receivers in order to extract uncorrelated signals measured by the first receiver.

a4 Cont.

add a7

add B1